(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date 6 January 2005 (06.01.2005)

PCT

(10) International Publication Number WO 2005/002124 A3

(51) International Patent Classification7:

H04Q 7/20

(21) International Application Number:

PCT/US2004/020345

(22) International Filing Date:

24 June 2004 (24.06.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 60/480,735

24 June 2003 (24.06.2003)

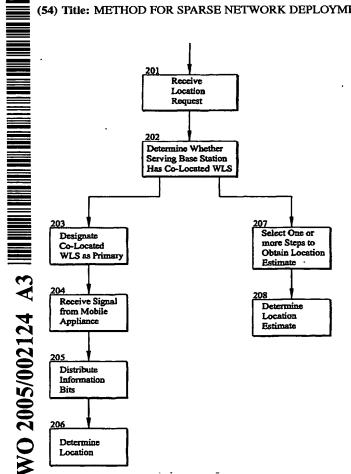
- (71) Applicant (for all designated States except US): AN-DREW CORPORATION [US/US]; 19700 Janelia Farm Boulevard, Ashburn, VA 20147 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): KENNEDY, Joseph, P., Jr. [US/US]; 11127 Elmview Place, Great Falls, VA

22066 (US). CARLSON, John, Peter [US/US]; 12006 Trossack Road, Herndon, VA 20170 (US), ALLES, Martin [US/US]; 2421 Williams Avenue, Vienna, VA 22180 (US).

- (74) Agent: COMTOIS, Mark, C.; 1667 K Street, N.W., Suite 700, Washington, DC 20006 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH,

[Continued on next page]

(54) Title: METHOD FOR SPARSE NETWORK DEPLOYMENT ACCURACY ENHANCEMENTS



(57) Abstract: A method for use in a wireless communication system with a network overlay geolocation system having a sparse deployment network in which base stations of the wireless communication system may or may not have a co-located wireless location sensors (WLS) (202). The method enables detection and measurement of a target mobile's signal (204) independently from a primary WLS located at the base station serving the target mobile (203), which enable location estimated in previous "no location" areas. The method selects based on predetermined criteria from one or more of several techniques that aid in the detection and determining a location for the target mobile (207). The method selects from timing advance, power levels, pattern matching, EOTD, speed, and pseudo range measurements to estimate the location of the mobile (208). The method also uses ambiguity function processing to detect the signal and measure an attribute of the signal.

GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

with international search report

(88) Date of publication of the international search report: 14 April 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/20345

A. CLASSIFICATION OF SUBJECT MATTER IPC(7) : H04Q 7/20 US CL : 455/456.1					
According to International Patent Classification (IPC) or to both national classification and IPC B. FIELDS SEARCHED					
Minimum documentation searched (classification system followed by classification symbols)					
U.S.: 455/456.1, 456.2, 456.5, 456.6, 561					
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched					
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)					
C. DOCUMENTS CONSIDERED TO BE RELEVANT					
Category *	Citation of document, with indication, where appropriate, of the relevant passages			Relevant to claim No.	
Α	US 5,600,706 A (DUNN et al.) 04 February 1997 (04.02.1997); abstract, fig. 2			1-23	
х	X US 5,973,643 A (HAWKES et al.) 26 October 1999 (26.10.1999); fig. 1, abstract, col. 5:			1, 4	
<u> </u>	lines 18-25			2-3, 5-23	
A				2-3, 3-23	
1					
[
			:		
				•	
Furthe	r documents are listed in the continuation of Box C.		See patent family annex.		
Special categories of cited documents:			"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand		
"A" document defining the general state of the art which is not considered to be of particular relevance			the principle or theory underlying the	invention	
1 .	pplication or patent published on or after the international filing	"X"	document of particular relevance; the considered novel or cannot be considered step when the document is taken along	ered to involve an inventive	
	nt which may throw doubts on priority claim(s) or which is cited to the publication date of another citation or other special reason (as f)	"Y"	document of particular relevance; the considered to involve an inventive ste combined with one or more other such being obvious to a person skilled in the constant of the con	p when the document is h documents, such combination	
"O" document referring to an oral disclosure, use, exhibition or other means		*&*	document member of the same patent		
"P" document published prior to the international filing date but later than the		œ.	document member of the same patent	laimy	
Date of the actual completion of the international search		Date of mailing of the international search report			
02 January 2005 (02.01.2005)) JAN 2005		
N V			ed officer		
Mail Stop PCT, Attn: ISA/US Commissioner for Patents			Erika A. Gary William (1)		
P.O. Box 1450		Telephone No. 703-305-4750			
Alexandria, Virginia 22313–1450 Welephone No. 703-305-4750 Facsimile No. (703) 305-3230					